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CHANGES IN THE FINANCIAL STRUCTURE IN NIGER: BEFORE AND AFTER THE CPECs

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I. INTRODUCTION

This paper reports on the changes in the financial markets in Zinder since the establishment of the Credit Unions or the Caisse Populaire d'Epargne et de Crédit (CPECs). The main focus of our analysis is to examine the changes in individuals' use of financial services in the Zinder region. The changes will be assessed with reference to two points in time, 1991 and 1995. It is important to review the characteristics of the 1991 financial markets and individuals' use of the available financial services because that represented the state of the rural financial markets in Zinder prior to the establishment of the CPECs. In our review of individuals' use of the various financial services in 1995, we will shed some light on the prevailing contracts, both savings and loans, offered by formal financial institutions, banks and non-banks, as well as by the various informal agents and groups. The assessment of the role and performance of formal financial institutions, banks and non-banks, is not sufficient to evaluate individuals' demand for and use of alternative financial services. Studies of formal financial institutions typically focus on examining the viability of these institutions, the services they provide, and the profile of their member clientele. Many questions about the clients' use of other financial services and the relative importance of the services offered by the institution in question in the members and non-members' financial portfolios remain unanswered. The primary purpose of this research is to analyze the changes in the individuals' choice of the sources of funding and savings channels they draw upon in the rural region of Zinder before the CPECs were established in 1991 and four years later in 1995.

This paper deals primarily with two surveys conducted in Zinder in 1991 and 1995. The following section reports on the Zinder surveys outlining, first, various socio-economic characteristics of the individuals and second, highlighting the significance of the existing financial channels individuals, CPEC members, farmers, entrepreneurs and salaried employees, use in financing their operations. The third section examines the capital structure determinants among individuals in the Zinder 1991 survey and the Zinder 1995 survey. The fourth, and last section, summarizes the findings and discusses some implications.

II. FINANCIAL MARKETS IN ZINDER: 1991 AND 1995

1. Overview of The Surveys

The World Council for Credit Unions (WOCCU) funded a study of the credit union development potential in the Zinder region of Niger in 1991. The study involved a household baseline survey in 11 villages in Zinder[1]. The objectives of the study were to determine the selection criteria for credit union development among the villages in the region and to generate village profiles pertaining to economic, financial and social indicators for the 11 villages under study. A survey instrument that involved individual questionnaires to men and women was administered roughly to 4.5 percent of each of the villages' active population in April and May, 1991. A number of indicators measuring household revenues, physical and financial assets were generated for all the villages and consequently were used to provide individual ranking of the villages in the sample. The results of the survey suggested that WOCCU should focus its efforts on five villages that include Dungas, Maguirami, Kantché, Matameye and Wacha.

To examine the alternative financial networks in the Zinder region a few years after the CPECs have been in operation, a survey of both CPEC members and non-members was carried out in April and May of 1995. The survey attempted to revisit a random sub-sample of the 1991 sample in three villages--Dungas, Matameye and Kantché. In carrying out the 1995 survey, an equal number of men and women members were randomly selected from the CPECs in the three villages in addition to an equal number of women and men non-members. A fourth village, Sassoumbroum, where the first CPEC was established and Zinder-ville, the capital of Zinder region, were also included in the survey. The Zinder 1995 survey, thus, comprised of 400 individuals in four villages and one town. We consider in this analysis, however, only the 241 individuals who were interviewed in the three villages of Dungas, Matameye and Kantché. A total of 116 individuals who were in the 1991 sample were located and interviewed among the 241 individuals who make up our 1995 sample. The primary purpose of the survey in 1995 was to examine the individuals' entrepreneurial activities, both farm and non-farm, and their financial transactions.

2. Socio-Economic Characteristics of the Samples

The two surveys conducted in Zinder in 1991 and 1995 have many similar characteristics. Table 1 provides several socio-economic indicators that highlight the similarities in the two samples. A total of 532 individuals who were interviewed in 1991 in the three villages of Dungas, Kantché and Matameye are our 1991 sample. This sample allows us to compare the general socio-economic characteristics of individuals interviewed in these villages with the 1995 sample in the same three villages. It is important to note, first, that both surveys interviewed an equal number of women and men in the three villages. Second, roughly one third of the respondents in both samples are literate, whereas two thirds are heads of their households that average about 8 members. The 1995 survey,

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[1] See report by Carlos E. Cuevas, 1992.

on the one hand, has almost an equal number of entrepreneurs and salaried employees which comprises about 22 percent of the sample each, and about 55 percent farmers. The 1991 survey, on the other hand, has about two thirds of the respondents engaged primarily in farming activities, about one third operating microenterprises, and only a few salaried employees. Microentrepreneurs in the 1995 survey reported that they have been in operation for about 15 years and employ on average only one worker. Most of the respondents in both the 1991 and 1995 surveys have lived in their villages most of their lives. However, the average value of physical assets and revenue differ for both samples. The 1995 respondents reported an average value of physical assets of about FCFA one million (US$2,190) whereas the reported average value of physical assets for the 1991 sample is about FCFA 103,978 (US$416). The average revenue for the 1991 sample of about FCFA one million (US$4,182), however, exceeds the reported FCFA 738,989 (US$1,478) estimate for 1995. These differences are due in part to the devaluation of the currency that took place in January 1994 as well as different documentation of the components of revenues in both surveys[2].

3. Financial Channels Used by CPEC Members and Non-Members: 1991 and 1995

The 1995 survey included an equal number of CPEC members and non-members. The use of informal financial services by members and non-members does not seem to differ (Table 2). However, the use of formal financial services by members and non-members seems to differ significantly. First, the absolute majority of CPEC members and non-members use cash, about half of each group use informal loans, and about less than one third use trade credit. With respect to participation in informal groups, a few of CPEC members and non-members are tontines participants and keep savings with money-guards. On the formal side, CPEC members use more financial services from formal institutions than non-members. About one third of the CPEC members (27 percent) have used formal loans from a formal institution and the majority of these formal loans have been granted by the CPECs. Only a few non-members (8 percent), however, have used a formal loan from an NGO. None of the CPEC members or non-members have used a formal loan from a bank. Moreover, the majority of CPEC members use deposit services with formal financial institutions and in particular the CPECs. Similar to their limited use of formal loans, only few non-members save with the formal sector for saving purposes.

The financial patterns demonstrated by the CPEC members and non-members in the 1995 survey are quite different from those revealed from the 1991 survey. The 1991 survey indicates that about one third of the sample used informal loans, about half use trade loans, and again one third used informal holdings with tontines and money-guards. The financial patterns differ particularly because in 1991 there was no reported use of formal services from any type of financial or non-financial institution, whereas in 1995 the data reveals some demand for financial services from the formal markets particularly by CPEC members. In addition, the 1991 results indicate a higher degree of participation in informal groups, tontines, than the 1995 survey, and no use of formal

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[2] The 1995 survey accounts for physical assets used in production on the farm and for non-farm enterprises. The 1991 survey, however, does not document all the physical assets as in the 1995 survey.

savings channels. In contrast the 1995 survey results indicate a lower participation in tontines and a greater use of formal savings channels.

4. Financial Channels Used by Individuals in the 1991 Revisited Sample

To compare more closely the changes in the financial patterns between the 1991 and 1995 surveys, we attempted to follow up the interviews in 1995 with a random sample of the same individuals who were interviewed in the 1991 survey. This group who was identified and interviewed in 1995 is labeled as the Zinder 91 recall group, which comprises about one half of the 1995 sample in the three villages (Table 3). Most importantly, it is useful to note that about half of the 1991 recall sample (43 percent) are currently CPEC members. As suggested in the previous section, the recall group emphasizes the changes highlighted in the individuals' use of the alternative financial services. The 1991 recall group uses more formal loans and deposits and participates less in informal groups in 1995 than four years ago. Interestingly, the most recognizable difference among the recall and the new sample is in the higher use of formal deposits by the new group compared to the recall group. Finally, recall group of the 1995 survey use more informal loans and less trade credit than the 1991 survey indicating generally changes in the demand for and the use of financial services in 1995 compared to 1991.

5. Sub-Sector Variations in the Use of Financial Services in Zinder: 1991 and 1995

Sector of operation is among the determinants of the economic agent's--farmers, entrepreneurs and employees--demand for and use of financial services. The nature of the economic activities, types of inputs and outputs, directly affect the nature of the financial contracts that characterize trade transactions and the overall demand for financial services by individuals. The sector composition of the 1995 and 1991 samples differ to some extent. As discussed earlier, the 1995 sample is made up of about 21 percent entrepreneurs, 22 percent salaried employees and about 55 percent farmers, whereas the 1991 sample includes about 70 percent farmers, 27 percent entrepreneurs and 2 percent salaried employees. Figures in table 4 demonstrate the differences between the 1991 and 1995 surveys and in addition highlight the differences across sectors in the two surveys. As expected entrepreneurs in the 1995 survey report a higher use of trade credit than individuals in the other sectors. Salaried employees, on the one hand, report a slightly higher use of formal deposits compared to entrepreneurs and farmers. Farmers, on the other hand, save to a smaller extent with informal groups and money-keepers than entrepreneurs and salaried entrepreneurs. These patterns might be explained by the regular inflow of cash employees and entrepreneurs receive compared to the seasonal cash flow of farmers. In contrast, in the 1991 survey, where there were no reported savings with formal channels, more salaried employees saved with the informal groups and borrowed from informal sources than individuals in any other sector of activity.

III. CHANGES IN THE FINANCIAL STRUCTURE IN ZINDER: BEFORE AND AFTER THE CPECS

Assessment of the changes in the financial market before and after the establishment of microfinance institutions and the changes in the financial structure of their clientele is a crucial tool for the evaluation of these institutions. This is based on a number of factors. Numerous research efforts have consistently indicated that micro and small scale enterprises generate significant local employment, augment forward and backward linkages with farm enterprises and contribute to economic growth. Therefore, research pertinent to the operations of microfinance institutions continue to be among the priorities of many donors and policy makers concerned with securing financial and non-financial services for various economic agents--microentrepreneurs, farmers, women--and households in low income countries. The persistent question is to what extent these institutions assist the operations and evolution of their clients. Most research that describes the sources of finance for clients of microfinance institutions in low income countries is based on a descriptive rather than a diagnostic framework. The frequent identification of finance as the primary obstacle for developing small scale enterprises is based on a weak methodology when the source of data used is based on a depiction of the individuals' own subjective responses when questioned about their credit needs. Consequently, there is a persisting lack of understanding and recognition of the underlying financial structure of these economic units and households because of the lack of adequate financial market assessment.

The financial market assessment conducted in this paper involves examining the importance of the alternative financial instruments in the financial structure of the economic units and the changes in the economic agent's participation in financial markets after the establishment of the CPECs in Zinder. The study of the current and changing financial structure provides evidence of the success or failure of the CPECs in providing competitive financial contracts that represent relatively important services for the economic agents and meet a part of their demand. Therefore, the study of the agent/household's use of the alternative financial instruments available in Zinder sheds light on the existing patterns of financing, their relative significance in the overall financial structure of the firm/household, changes in their financial structure, and the determinants of the existing simultaneous financial contracts.

The next section will present the econometric methods and analysis used to examine the financial structure of economic agents in Zinder in 1991. That will be followed by the econometric methods and analysis used to examine the financial structure of economic agents in Zinder in 1995. Given that the two samples have similar characteristics, the results of the two econometric models will then be compared. Moreover, appropriate variables are introduced in the models to capture the relationship between CPEC membership and the use of the alternative financial services in Zinder. Finally, the results and conclusions will be drawn in part four of this paper.

1. Econometric Method and Results of the 1991 Survey

A. Econometric Method

The financial markets in Zinder in 1991 were largely dominated by informal financial contracts. Therefore, it was not surprising to find no formal financial contracts used by the sample

surveyed in the three villages in the study. An individual's use of alternative financial services is determined by a number of factors including, sector of operation, characteristics of the individual, rates of return, interest rates and transaction costs associated with the alternative financial assets and liabilities[3]. The reported allocations of financial assets and liabilities used to finance an individual for a given period are jointly determined in a structural system of simultaneous equations (eqs. 1-3). The shares of the alternative financial assets and liabilities are jointly determined by attributes of the entrepreneur and characteristics of the enterprise, the respective interest rates, rates of return and transcation costs and the alternatives shares of financial assets and liabilities. The variables specified in the empirical model are presented in table 5. The financial assets and liabilities available in the Zinder 1991 financial markets represent the amounts of informal loans (IL) borrowed from friends, relatives and moneylenders among others over the past 12 months in equation 1, and the amount of funds deposited with informal groups and money-guards (IH) over the past 12 months in equation 2. The information pertinent to the use of trade credit (TL) identifies whether or not the individual uses trade credit from input suppliers or output traders. Therefore, equation 3 presents a dichotomous dependent variable since the amount of trade credit used is not available. The empirical model that describes the use of the alternative sources of finance available in Zinder in 1991 can be written as the following simultaneous equations system:

$$(IL)=\beta_{10}+\beta_{11}(t_{IL})+\beta_{12}(i_{IL})+\beta_{13}(r_{IH})+\beta_{14}(t_{IH})+\beta_{15}(IH)+\beta_{16}(Y_K) \quad \textbf{(1)}$$

$$(IH)=\beta_{20}+\beta_{21}(t_{IH})+\beta_{22}(r_{IH})+\beta_{23}(i_{IL})+\beta_{24}(t_{IL})+\beta_{25}(TL)+\beta_{26}(Y_K) \quad \textbf{(2)}$$

$$(TL)=\beta_{30}+\beta_{31}(t_{IL})+\beta_{32}(i_{IL})+\beta_{33}(r_{IH})+\beta_{34}(t_{IH})+\beta_{35}(IL)+\beta_{36}(Y_K) \quad \textbf{(3)}$$

The array of the different financing sources that an individual may use represents some zero and non-zero amounts for the variables (IL and IH) on the left hand side (LHS) of the equations 1 and 2 in the empirical model. The sequential two-stage estimation technique used in the estimation involves, first, estimating the reduced form equations using the standard tobit or probit models for equations with limited LHS variables as appropriate for each reduced form equation (Table 6). Second, we obtain the predicted values of the endogenous variables from step 1, and insert the predictors for the endogenous variables on the RHS of the equations in the structural model. Third,

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[3] Baydas, 1993 presents a model of the capital structure determinants derived for the manufacturing enterprise sector in developing countries. In this section we use a modified empirical model based on the information available to test for the capital structure determinants in Zinder 1991.

we estimate the structural equations using the tobit maximum likelihood technique or probit to generate the results of the model presented in table 7. This methodology is similar to that used in Nelson and Olson's model (1978), reviewed by Amemiya (1984) under a type 4 tobit model, which generates consistent and asymptotically normal estimates.

B. Econometric Estimation Results of the 1991 Survey

The results of the reduced form equations reveal that household size is positively associated with larger amounts of informal loans. Moreover, the number of years spent in the village is also positively associated with larger amounts of informal loans. These two results are not surprising. The longer an individual has lived in a village the more information there is about her/his character and reliability. Therefore, less village members would be faced with asymmetric information problems due to lack of information about borrowers. Interestingly, the gender coefficient indicates that men used more informal loans than women in the Zinder 1991 sample. Finally, transaction costs incurred in obtaining informal loans and rates of return on informal holdings are positively associated with the use of informal loans.

With respect to the use of informal holdings, the results of the reduced form equations indicate that a large value of animal assets is positively associated with larger deposits with informal groups. This implies that the two forms of savings are complements rather than substitutes. Moreover, sector of operation indicates that farmers and entrepreneurs hold less informal holdings with tontines than salaried employees. This is also not surprising because salaried employees receive regular income and can fulfill their promised savings with RoSCAs on time compared to the irregular cash flow that farmers and entrepreneurs receive. Surprisingly, education implies that more educated individuals hold larger amounts of informal holdings with tontines. This is, however, in line with the relationship that salaried employees hold more informal holdings than farmers and entrepreneurs; since salaried employees are likely to be more educated. Finally, transaction costs incurred in the use of informal holdings and informal loans and interest rates on informal loans are positively associated with larger amounts of informal holdings.

With respect to the use of trade loans, the model did not yield many significant findings. Transaction costs associated with the use of informal loans and informal holdings indicate that there is a higher probability of using trade loans with increases in these transaction costs. However, the rate of return on informal holdings indicates that there is a lower probability of using trade loans with increases in rates of return on informal holdings.

The second stage results of the model, essentially enforce the long-term implications yielded from the first stage estimation results. Surprisingly, however, the second stage estimation results imply that uses of the alternative financial assets and liabilities are independent. That is, the use of informal loans is not associated with the use of informal holdings or trade loans. This is an interesting result, because it implies that the use of the alternative financial assets and liabilities is not simultaneously determined and that the financial markets in Zinder were segmented in 1991.

2. Econometric Methods and Results of the 1995 Survey

A. Econometric Methods

The financial markets in Zinder in 1995 provide an array of formal and informal services that are used by CPEC members and non-members. The allocations of financial assets and liabilities used to finance an individual's activities for a given period are jointly determined in a structural system of simultaneous equations (eqs. 4-8)[4]. The variables specified in the model are presented in table 8. The empirical model that is derived from the general structural simultaneous equations system can be written as:

$$(\frac{C}{T}) = \beta_{10} + \beta_{11}(t_C) + \beta_{12}(r_C) + \beta_{13}(i_{IL}) + \beta_{14}(t_{IL}) + \beta_{15}(\frac{IL}{T}) + \beta_{16}(Y_K) \quad \textbf{(4)}$$

$$(\frac{IL}{T}) = \beta_{20} + \beta_{21}(t_{IL}) + \beta_{22}(i_{IL}) + \beta_{23}(r_{IH}) + \beta_{24}(t_{IH}) + \beta_{25}(\frac{IH}{T}) + \beta_{26}(Y_K) \quad \textbf{(5)}$$

$$(\frac{IH}{T}) = \beta_{30} + \beta_{31}(t_{IH}) + \beta_{32}(r_{IH}) + \beta_{33}(i_{TL}) + \beta_{34}(t_{TL}) + \beta_{35}(\frac{TL}{T}) + \beta_{36}(Y_K \quad \textbf{(6)}$$

$$(\frac{TL}{T}) = \beta_{40} + \beta_{41}(t_{TL}) + \beta_{42}(i_{TL}) + \beta_{43}(r_D) + \beta_{44}(t_D) + \beta_{45}(\frac{D}{T}) + \beta_{46}(Y_K) \quad \textbf{(7)}$$

$$(\frac{D}{T}) = \beta_{50} + \beta_{51}(t_D) + \beta_{52}(r_D) + \beta_{53}(i_{FL}) + \beta_{54}(t_{FL}) + \beta_{55}(\frac{FL}{T}) + \beta_{56}(Y_K) \quad \textbf{(8)}$$

The observed amounts of financial assets and liabilities used to finance the operating costs for a given period are jointly determined in a simultaneous structural system. The array of the different financing sources that an entrepreneur may use to fund total expenditures over inputs represents some zero and non-zero amounts for the variables (C/T, IL/T, IH/T, TL/T, D/T, FL/T) on

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[4] The documented information allows us to estimate the capital structure of individuals across the three sectors of farming, enterprise and salaried employment.

the left hand side (LHS) of the equations in the model. The sequential two-stage estimation technique used in the study involves, first, estimating the reduced form equations using the standard tobit model for equations with limited LHS variables or least squares for unconstrained LHS variables, as appropriate for each reduced form equation (Table 9). Second, we obtain the predicted values of the endogenous variables from step 1, and insert the predictors for the endogenous variables on the RHS of the equations in the structural model. Third, we estimate the structural equations using the tobit maximum likelihood technique or least squares to generate the results of the model presented in table 10. This methodology is similar to that used in Nelson and Olson's model (1978), reviewed by Amemiya (1984) under a type 4 tobit model, which generates consistent and asymptotically normal estimates.

The model is estimated using the linear-log functional form. The literature does not provide any implications as to which functional form is more appropriate; however, having a set of variables derived from the marginal productivity of physical capital among the explanatory variables suggests that the linear-log form may describe the true functional form better than the linear form.[5]

B. Econometric Estimation Results of the 1995 Survey

Table 9 presents the results of the long-term multipliers generated from the first-stage estimation of the reduced form equations. Among the significant relationships, is the indication that farmers are associated with the use of more cash as a proportion of total expenditure as compared to entrepreneurs and salaried employees. Older individuals, however, use less cash as a proportion of total expenditure as compared to younger entrepreneurs. Moreover, interest rates of informal loans are associated with increases in the use of cash, whereas interest on trade loans is negatively associated with the use of cash as a proportion of total expenditure. Finally, transaction costs incurred in the use of informal and trade loans are negatively associated with the use of cash as a proportion of total expenditure.

Characteristics of the enterprise including profitability, size of employment, years in business, and sub-sector of operation, do not seem to affect the use of informal loans. Among the attributes of the individuals, only gender seems to be associated with the individuals' use of informal loans. Men seem to use less informal loans as a proportion of total expenditure than women in the Zinder 1995 survey. Interest rates paid on informal loans are negatively associated with increases in the use of informal loans as a proportion of total expenditure. Interest rates on formal loans are positively associated with the use of informal loans as a proportion of total expenditure. Moreover, transaction costs associated with the use of cash and formal deposits are also negatively associated with the use of informal loans as a proportion of total expenditure. Transaction costs incurred when using informal loans, however, are positively associated with increases in the use of informal loans

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[5] The production function is a general power function which is estimated more efficiently using the log functional form.

as a proportion of total expenditure. Finally, CPEC members are associated with using less informal loans as a proportion of total expenditure compared to non-members.

Larger farm and non-farm enterprises, as indicated by the value of physical capital, are negatively associated with having larger amounts of informal holdings as a proportion of total expenditure. Profitability, size of the enterprise and sub-sector of operation, however, do not seem to influence the individual's use of informal holdings. Individuals who were in the 1991 sample participate in informal groups more than those who were not interviewed in 1991. Not surprisingly, larger amounts of transaction costs incurred in participating in tontines are positively associated with larger amounts of informal holdings as a proportion of total expenditure. Finally, CPEC members are associated with using less informal holdings as a proportion of total expenditure compared to non-members.

Trade loans as a proportion of total expenditure are positively associated with increased profitability of the business. Sub-sector differences seem to have an effect on the individuals' use of trade finance. Farmers use smaller amounts of trade finance as a proportion of total expenditure compared to entrepreneurs and salaried employees. This finding may be explained by the large observed amounts of customer advances flowing to entrepreneurs versus the more limited amounts of customer advances or supplier credit that farmers receive. Older individuals are associated with using more trade loans as a proportion of total expenditure as compared to younger individuals. Interestingly, gender indicates that women use more trade loans as a proportion of total expenditure compared to men. A higher rate of return on informal deposits is positively associated with larger amounts of trade finance. A higher interest rate on informal loans is negatively associated with the use of trade loans. Finally, increases in transaction costs incurred while using trade finance are positively associated with increases in trade loans.

The use of formal deposits with banks and CPECs is negatively associated with farming activities compared to salaried employees and entrepreneurs. Attributes of the individual seem to influence their saving behavior. Older entrepreneurs are associated with using more deposits in formal institutions as a proportion of total expenditure than younger entrepreneurs. Moreover, men have larger amounts of deposits with commercial banks as a proportion of total expenditure compared to women. Individuals who were originally interviewed in the 1991 survey and became CPEC members also hold larger amounts of deposits with the CPECs. Transaction costs associated with trade loans are positively associated with having larger amounts of deposits.

Formal loans as a proportion of total expenditure are negatively associated with the physical assets of the enterprise. This is not surprising considering that physical assets are not used as collateral when credit unions grant loans. Moreover, men seem to use less formal loans compared to women. As expected CPEC member use more formal loans as a proportion of total expenditure than CPEC non-members. Rate of return on cash, proxied by the household size, is negatively associated with the use of formal loans while rate of return on informal deposits in positively associated with the use of formal loans. Interest rates of formal loans are negatively associated with

the use of formal loans while transaction costs of formal loans are positively associated with the use of formal loans as a proportion of total expenditure.

Results of the second-stage estimation, presented in table 10, carry similar significance with respect to some variables and attach less importance to others as compared to the long-term relationships reflected in the first-stage estimation. With respect to cash holdings, results of the structural equations indicate that traders use less cash as a proportion of total expenditure than farmers and salaried employees. Moreover, individuals interviewed in the 1991 survey use more cash as a proportion of total expenditure compared to those who were not interviewed in the 1991 survey. Finally, transaction costs of informal loans are negatively associated with the use of informal loans.

The results of second stage equation with respect to the use of informal loans, informal holdings and formal deposits stress the long-term effects indicated in first stage estimation. In addition to reinforcing the first stage results, the second stage estimation of the use of cash implies that enterprises that have been in business for a longer number of years use less cash as a proportion of total expenditure than those that have been in business for a shorter time. Larger enterprises, proxied by the number of employees, use less informal loans as a proportion of total expenditure than small enterprises. Moreover, the second stage estimation shows that men seem to use more cash, informal loans and deposits as a proportion of total expenditure than women. Finally, it is important to note that the use of the alternative financial assets and liabilities seems to be independent of each other. This is surprising because it implies no simultaneity in the use of financial services and the capital structure of individuals. Thus, this implies continued fragmentation of the financial markets in Zinder in 1995.

3. Changes in the Financial Structure in Zinder: Before and After the CPECs

The findings of the two models imply notable changes in the financial structure in Zinder over the past four years. Most significantly has been the introduction of formal financial services into the villages by the CPECs. Formal loan and deposit services, provided mainly by the CPECs, currently represent a significant component of the financial structure for individuals across all sectors of activities. These formal services are used to a smaller degree by farmers than by entrepreneurs or salaried employees. Moreover, older individuals and men seem to use deposit services to a larger extent than younger individuals and women. Interestingly, more women than men seem to use more trade credit and formal loans as proportion of total expenditure. In addition profitability of the business activity seems to be positively associated with the individuals' use of trade loans. With respect to the use of informal financial services, changes have occurred. Most notably is the reduced use of informal loans and informal holdings by CPEC members. Moreover, the value of physical assets is negatively associated with participating in informal groups which indicates that the physical and informal financial assets are substitutes rather than complements in the 1995 financial markets in Zinder compared to the complementarity relationship found in the 1991 Zinder financial markets. In addition, the value of physical assets is negatively associated with the use of formal loans which confirms that physical assets do not play a role as collateral for CPEC members.

IV. SUMMARY, LESSONS AND IMPLICATIONS

1. Summary of the Zinder Surveys

This paper reported on two surveys in the Zinder region in Niger in 1991 and 1995, before and after the CPEC movement was introduced in the rural areas. The main focus of our analysis was to examine the changes in the financial structure of individuals in general, and of CPEC members in particular. The 1991 study involved a household baseline survey in 11 villages in Zinder. The objectives of the study were to determine the selection criteria for credit union development among the villages in the region and to generate village profiles pertaining to economic, financial and social indicators for the 11 villages under study. A survey instrument that involved individual questionnaires to men and women was administered roughly to 4.5 percent of each of the villages' active population in April and May, 1991. A number of indicators measuring household revenues, physical and financial assets were generated for all the villages and consequently were used to provide individual ranking of the villages in the sample. The results of the survey suggested that WOCCU should focus its efforts on five villages that include Dungas, Maguirami, Kantché, Matameye and Wacha.

To examine the alternative financial networks in the Zinder region a few years after the CPECs have been in operation, a survey of both CPEC members and non-members was carried out in April and May of 1995. The survey attempted to revisit a random sub-sample of the 1991 sample in three villages--Dungas, Matameye and Kantché. The Zinder 1995 survey, thus, comprised of 241 individuals in the three villages of whom 116 individuals were among the 1991 sample. The primary purpose of this survey was to examine the individuals' entrepreneurial activities, both farm and non-farm, and their financial transactions.

There are numerous sources of funding savings channels individualsdraw upon. They fall into informal and formal networks. The informal channels that prevail in Zinder include family, friends, suppliers credit, customer advances, tontines (Rotating Credit and Savings Associations, or RoSCAs), and money keepers. Although the formal financial sector is expanding in Niger through the expansion of the CPEC movement, formal channels reported used in Zinder include only two commercial banks, the CPECs and a few NGOs. The sources of funding in the Zinder region before the establishment of the CPECs were informal loans, trade loans and informal holdings with tontines and money keepers. The sources of funding in the Zinder region after the establishment of the CPECs were principally retained earnings, trade finance, informal loans, informal holdings, formal deposits and formal loans.

Sources of finance for individuals' activities include both informal and formal channels, although they are concentrated on informal agents. First, most of the individuals (99 percent) operating in the various sectors of activity reported that they use retained earnings as a source of financing their current operations. Second, about 47 percent of the individuals reported that they draw upon informal sources of finance from family and friends in their current operations. This

represents a larger share of the 1995 sample compared to about 33 percent of the 1991 sample who reported using informal loans. Third, 22 percent of the individuals reported using customer advances and supplier credit to finance their business operations. This represents a smaller share of the 1995 sample as compared to the 52 percent of the 1991 sample who reported using trade credit. Fourth, and last, about 23 percent of the interviewed individuals have acquired formal finance from the CPEC or other non-bank institution in a few cases for the purpose of operating their businesses.

Individuals in the sample were found to participate in different savings channels before and after the establishment of the CPECs. Formal channels that became a part of individuals' portfolios in the 1995 sample, consisted of accounts largely with the CPECs. The informal channels continue to be represented by tontines and money keepers. Among the most common savings channels are the CPECs and commercial banks in a few cases. Roughly about half of the 1995 sample held at least an account with a formal financial institution in Zinder. Tontines and money keepers are the second most widely used saving channel among the individuals in the Zinder region. This informal savings channels which was used by 27 percent of the 1991 sample was used by only 12 percent of the 1995 sample. The most noticeable decline has been tontine participation as compared to saving with moneykeepers which represents about 5 percent of informal savings channels in 1995 compared to 3 percent in 1991.

2. Lessons and Implications

A. Lessons

The results of the two empirical models tested with the 1991 and 1995 Zinder samples provide several lessons and insights about the importance of the various financial services individuals in Zinder drew upon before and after the CPECs were established. First, cash or retained earnings are used less by farm and non-farm enterprises with larger number of employees, by traders and used more by the group of individuals who were interviewed in both the 1991 and 1995 surveys. Second, informal loans are larger for enterprises with a smaller number of entrepreneurs, for men more than women, and for non-members in CPECs. Third, increases in informal holdings are associated with a decreased value in physical capital, with individuals who were interviewed in both the 1991 and 1995 surveys, for men more than women and with non-members in CPECs. Fourth, increases in trade loans are associated with increases in profitability, with entrepreneurs and salaried employees more than farmers, with individuals who were not interviewed in both the 1991 and 1995 surveys, and with older individuals. Fifth, increases in deposit holdings are associated with individuals engaged in sectors of activities other than farming, with individuals who were interviewed in both the 1991 and 1995 surveys, with older individuals and with men more than women. And finally, sixth, the long-term effects of using formal debt financing indicate that formal loans increase with an decreased value of physical assets, for women more than men, and for CPEC members.

B. Policy Implications

The financial market assessment conducted in this paper involved examining the importance of the alternative financial services in the financial structure of the economic agents and the changes in their participation in financial markets after the establishment of the CPECs in Zinder. The study of the current and changing financial structure provided evidence of the success of the CPECs in providing competitive financial contracts that represent relatively important services for economic units and meet a part of their demand for both savings and loan services. Moreover, the study of the agent/household's use of the alternative financial instruments available in Zinder sheds light on the existing patterns of financing, their relative significance in the overall financial structure of the firm/household, changes in the financial structure, and the determinants of the existing financial contracts.

It is clear that several informal and formal financial channels exist for individuals to draw upon to finance their activities and to diversify their portfolios in Zinder in 1995. However, since the establishment of the CPECs, members have been using less informal loans and savings from friends and family, participating less in tontines, and using more formal loans and savings from the CPECs. The challenge for the CPECs in the future is to attract the non-members in the communities to join the movement, to attract more women to use their savings services and to attract more farmers into their circle of members. Trade loans continue to be important for certain classes of entrepreneurs, and therefore, it is important that the CPECs attempt to attract more traders in their network, and therefore, allow for trade financing to become a more competitive financial contract.

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Table 1. **Socio-economic Characteristics of Individuals in the 1991 and 1995 Samples in Zinder**

	Zinder 95	Zinder 91
Sample Size	241 (100%)	532 (100%)
Average Age	46 years	52 years
Gender		
Males	123 (51%)	266 (50%)
Females	118 (49%)	266 (50%)
Literate	91 (38%)	205 (38%)
Household Head	149 (62%)	296 (56%)
Average Household Size	9 members	7 members
Sector		
Farming	131 (55%)	379 (70%)
Enterprise	49 (21%)	145 (27%)
Salaried Employee	52 (22%)	21 (3%)
Average No. of Employees	1	n.a.
Average Years of Experience	15 years	n.a.
Average Years Lived in Village	38 years	50 years
Average Value of Physical Assets	FCFA 1,374,167	FCFA 103,978
Average Revenue	FCFA 738,989	FCFA 1,045,699

Source: OSU Zinder Survey, 1995; Cuevas, 1992.

Table 2. **CPEC Members and Non-members Use of Financial Services in Zinder: 1991 and 1995**

	Zinder 95 (N=241)			Zinder 91 (N=532)
	CPECM	Non-members	Total	Total
Cash	120 (98%)	118 (99%)	238 (99%)	n.a.
Informal Loans	48 (39%)	65 (55%)	113 (47%)	178 (33%)
Trade Loans	31 (25%)	21 (18%)	52 (22%)	276 (52%)
Formal Loans	45 (27%)	10 (8%)	55 (23%)	0
Banks	0	0	0	0
CPEC	33 (27%)	0	33 (14%)	0
NGO	11 (9%)	9 (8%)	20 (8%)	0
Others	7 (5%)	1 (1%)	8 (3%)	0
Deposits	94 (77%)	11 (9%)	105 (44%)	0
Banks	1 (1%)	0 (0%)	1 (0.5%)	0
CPECs	94 (77%)	11 (9%)	105 (44%)	0
NGO	4 (3%)	2 (2%)	6 (3%)	0
Informal Holdings	17 (14%)	12 (11%)	29 (12%)	144 (27%)
Tontines	13 (11%)	6 (5%)	19 (7%)	131 (25%)
Moneyguard	7 (6%)	6 (5%)	13 (5%)	19 (3%)
Sample Size	122 (100%)	119 (100%)	241 (100%)	532 (100%)

Source: OSU Zinder Survey, 1995; Cuevas, 1992.

Table 3. The 1991 Revisited Sample Use of Financial Services in Zinder: 1991-1995

	Zinder 91	Zinder 95	
	Total	Zinder 91 Recall	New Sub-Sample
CPEC Members	0	50 (43%)	72 (58%)
Cash	n.a.	116 (100%)	122 (98%)
Informal Loans	178 (33%)	58 (50%)	55 (44%)
Trade Loans	276 (52%)	16 (14%)	36 (29%)
Formal Loans	0	24 (19%)	33 (26%)
Banks	0	0	0
CPEC	0	13 (11%)	20 (16%)
NGO	0	10 (9%)	10 (6%)
Others	0	2 (2%)	6 (5%)
Deposits	0	38 (33%)	67 (54%)
Banks	0	0	1 (1%)
CPECs	0	38 (33%)	67 (54%)
NGO	0	3 (2%)	3 (2%)
Informal Holdings	144 (27%)	13 (11%)	16 (13%)
Tontines	131 (25%)	10 (9%)	9 (7%)
Money guard	19 (3%)	4 (3%)	9 (7%)
Sample Size	532 (100%)	116 (100%)	125 (100%)

Source: OSU Zinder Survey, 1995; Cuevas, 1992.

Table 4. Use of Financial Services by Zinder Samples in 1991 and 1995 by Sector of Operation

	Zinder 95			Zinder 91		
	Farmers	Enterprises	Salaried	Farmers	Enterprises	Salaried
CPECM	59 (45%)	24 (49%)	35 (67%)	0	0	0
Cash	131 (100%)	47 (96%)	50 (98%)	n.a.	n.a.	n.a.
Informal Loans	65 (50%)	24 (49%)	21 (40%)	132 (35%)	42 (29%)	4 (50%)
Trade Loans	26 (20%)	17 (35%)	9 (7%)	276 (52%)	n.a.	n.a.
Formal Loans	28 (21%)	14 (29%)	11 (23%)	0	0	0
CPEC	12 (9%)	7 (16%)	11 (23%)	0	0	0
NGO	15 (11%)	5 (10%)	0	0	0	0
Others	7 (5%)	1 (2%)	0 (0%)	0	0	0
Deposits	49 (37%)	26 (53%)	28 (56%)	0	0	0
Banks	1 (1%)	0	8 (15%)	0	0	0
CPECs	49 (38%)	26 (53%)	28 (54%)	0	0	0
NGO	1 (1%)	3 (6%)	2 (4%)	0	0	0
Informal Holdings	13 (9%)	6 (12%)	8 (15%)	87 (21%)	53 (36%)	4 (50%)
Tontines	7 (5%)	4 (8%)	6 (12%)	79 (21%)	48 (33%)	4 (50%)
Moneyguard	7 (5%)	3 (6%)	3 (6%)	11 (3%)	8 (6%)	0
Total	131 (100%)	49 (100%)	52 (100%)	379 (100%)	145 (100%)	8 (100%)

Source: OSU Zinder Survey, 1995; Cuevas, 1992.

Table 5 . Definition of Variables in the Simultaneous Equations Model of the Different Sources of Financing for the Zinder 1991 Sample

Variables	Definition
Exogenous Variables	
A	Animal assets (FCFA);
Y	Total revenue (FCFA);
RMTNC	Total value of remittances (FCFA);
HHSIZE	Total number of household members;
HHLBR	Total number of household labor available for work;
FRM	Dummy variable = 1 for farmers;
ENT	Dummy variable = 1 for entrepreneurs;
YRSVLG	Number of years lived in the same village;
EDUC	Educational level of the entrepreneur;
GENDER	Dummy variable = 1 for male entrepreneurs;
AGE	Age of the entrepreneur (Years);
IIL	Interest rate on informal loans;
RIH	Rate of return on informal holdings;
TCIL	Transaction costs associated with informal loans (Km);
TCIH	Transaction costs associated with informal holdings (Km);
Endogenous Variables	
IL	Informal loans (FCFA);
IH	Informal Holdings (FCFA);
TL	Uses trade loans (FCFA);

Table 6. Reduced Form Equations of the Different Sources of Financing in Zinder 1991

Variables	TOBIT (IL)	TOBIT (IH)	PROBIT (TL)
Const.	- **	-	+
Y	-	-	-
A	-	+ ***	+
RMTNC	-	-	-
HHSIZE	+ ***	+	+
HHLBR	-	-	+
FRM	-	- ***	-
ENT	+	- ***	-
YRSVLG	+*	-	+
EDUC	+	+ *	-
GENDER	+***	+	-
AGE	+	-	+
IIL	+	+ ***	+
RIH	+ **	+	- ***
TCIL	+ ***	+ ***	+ *
TCIH	-	+ ***	+ ***
R-SQR			
CHI-SQR	92.41	267.68	32.92

***, ** & * represent significance at 1, 5 and 10 percent levels, respectively.

Table 7. Second-Stage Structural Equation Estimation of the Different Sources of Financing in Zinder 1991

Variables	TOBIT (IL)	TOBIT (IH)	PROBIT (TL)
Const	-1 39 ** *	1 10	0 34
	(0 13)	(1 61)	(0 51)
Y	-0 01	-0 24	-0 08
	(0 01)	(0 26)	(0 14)
A	-0 01	0 14 ***	
	(0 01)	(0 04)	
RMTNC	-0 01	-0 32	
	(0 01)	(0 35)	
HHSIZE	-0 05 ***	0 01	
	(0 01)	(0 02)	
HHLBR			0 14
			(0 15)
FRM	-0 02	-2 38 ***	-0 29
	(0 48)	(0 51)	(0 51)
ENT	0 09	-2 42 ***	0 64
	(0 48)	(0 71)	(0 51)
YRSVLG	0 03	-0 01	0 60
	(0 03)	(0 03)	(0 89)
EDUC	0 02	0 32 *	-0 05
	(0 13)	(0 20)	(0 14)
GENDER	0 55	0 14	-0 11
	(0 15)	(0 23)	(0 18)
AGE	0 03	-0 06	0 33
	(0 03)	(0 61)	(0 79)
IIL	0 03	0 18 **	0 16
	(0 05)	(0 08)	(0 34)
RIH	0 29 ***	-0 33	-0 64 ***
	(0 13)	(0 57)	(0 17)
TCIL	0 02 ***	0 08 ***	0 01
	(0 01)	(0 27)	(0 01)
TCIH	0 02	3 34 ***	1 13 ***
	(0 29)	(1 06)	(0 26)
ILHAT			
IHHAT	-0 34		0 04
	(0 078		(0 14)
TLHAT		-2 08	
		(2 54)	
CHI-SQR	91 44	269 91	31 76

Asymptotic standard errors are reported in parentheses
***, ** & * represent significance at 1, 5 and 10 percent levels, respectively

Table 8 . Definition of Variables in the Simultaneous Equations Model of the Different Sources of Financing Shares Relative to Total Expenditure over Inputs in Zinder 1995

Variables	Definition
Exogenous Variables	
K	Physical assets (FCFA);
P	Total value of output (FCFA);
T	Total cost of inputs (FCFA);
EMPLY	Number of employees;
YRS	Number of years the enterprise has been in operation;
FRMR	Dummy variable = 1 for farmers;
TRDR	Dummy variable = 1 for entrepreneurs;
SLR	Dummy variable = 1 for salaried employees;
OLD	Dummy variable = 1 for individuals who were interviewed in the 1991 and 1995 surveys;
AGE	Age of the entrepreneur (Years);
EDUC	Educational level of the entrepreneur;
GENDER	Dummy variable = 1 for male entrepreneurs;
CPECM	Dummy variable = 1 for CPEC members;
RC	Rate of return on cash holdings;
IIL	Interest rate on informal loans;
RIH	Rate of return on informal holdings;
ITL	Interest rate on trade loans;
RD	Rate of return on deposits;
IFL	Interest rate on formal loans;
TCC	Transaction costs associated with cash holdings (Km);
TCIL	Transaction costs associated with informal loans (Km);
TCIH	Transaction costs associated with informal holdings (Km);
TCTL	Transaction costs associated with trade loans (Km);
TCD	Transaction costs associated with deposits (Km);
TCFL	Transaction costs associated with formal loans (Km);
Endogenous Variables	
CT	Cash holdings relative to total cost of inputs;
ILT	Informal loans relative to total cost of inputs;
IHT	Informal holdings relative to total cost of inputs;
TLT	Trade loans relative to total cost of inputs;
DT	Deposits relative to total cost of inputs;
FLT	Formal loans relative to total cost of inputs.

Table 9. **Reduced Form Equations of the Different Sources of Financing Relative to Total Expenditure Results (Linear-Log Functional Form) in Zinder 1995**

Variables	OLS (CT)	TOBIT (ILT)	TOBIT (IHT)	TOBIT (TL/T)	TOBIT (DT)	TOBIT (FLT)
Const.	+ ***	-*	+	-***	-	-
LK	+	+	-**	+	-	-**
LPT	-	+	+	+*	+	-
LEMPLY	+	-	+	-	-	+
LYRS	-	-	-	-	-	+
FRMR	+*	+	+	-**	-**	-
TRDR	-	-	-	-	-	-
OLD	+	-	+*	-	+**	+
LAGE	- **	+	-	+**	+ *	-
LEDUC	+	+	-	+	-	+
GENDER	+	+	+	-*	+ *	-**
CPECM	+	- ***	-**	+	+	+**
LRC	+	+	-	+	-	-*
LIIL	+**	- ***	-	-*	+*	-
LRIH	-	+	-	+ **	-	+**
LITL	-*	+	+	-	-	-
LRD	-	+	+	+	+	+
LIFL	-	+**	+**	-	+	- ***
LTCC	+	- ***	-**	+	-	-
LTCIL	- ***	+	-	+	-	+
LTCIH	-	+	+ ***	+	+	-
LTCTL	- ***	-	+	+***	+ ***	+
LTCD	-	-	+	+	+	+
LTCFL	+	-	+***	+	+	+ ***
R-SQR	0.18					
LH		45.14	-30.59	-87.89	-257.59	-24.33

***, ** & * represent significance at 1, 5 and 10 percent levels, respectively.

Table 10. Second-Stage Structural Equation Estimation of the Different Sources of Financing Relative to Total Expenditure (Linear-Log Functional Form) in Zinder 1995

Variables	OLS (CT)	TOBIT (ILT)	TOBIT (IHT)	TOBIT (TL/T)	TOBIT (DT)
Const	2 22 ***	-1 77 *	0 15	-6 28 ***	-9 08
	(0 66)	(1 25)	(1 67)	(2 23)	(282)
LK	-0 02	0 01	-0 03	-0 01	-0 01
	(0 02)	(0 03)	(0 04)	(0 06)	(0 04)
LPT	-0 01	0 03	0 04	0 11	0 09
	(0 03)	(0 05)	(0 06)	(0 08)	(0 07)
LEMPLY	-0 01	-0 25 *	-0 05	-0 16	-0 01
	(0 08)	(0 18)	(0 18)	(0 22)	(0 21)
LYRS	-0 09 *	-0 01	0 06	-0 17	-0 22 *
	(0 08)	(0 12)	(0 17)	(0 20)	(0 16)
FRMR	0 16 *	-0 06	-0 23	-0 71 *	-0 45 *
	(0 12)	(0 24)	(0 32)	(0 43)	(0 27)
TRDR	-0 14	0 05	-0 31	0 07	-0 31
	(0 14)	(0 27)	(0 35)	(0 41)	(0 29)
OLD	0 12 *	- 0 03	0 17	0 08	0 26
	(0 09)	(0 17)	(0 25)	(0 31)	(0 26)
LAGE	-0 26 *	0 17	-0 50	1 30 **	0 55
	(0 18)	(0 34)	(0 47)	(0 62)	(0 43)
LEDUC	-0 01	-0 02	0 18	-0 04	-0 18
	(0 06)	(0 11)	(0 14)	(0 18)	(0 14)
GENDER	0 17 *	0 33 **	0 42 *	-0 52 *	0 08
	(0 09)	(0 19)	(0 28)	(0 34)	(0 24)
CPECM	0 24	-0 49 ***	0 19	0 17	-0 08
	(0 24)	(0 18)	(0 24)	(0 32)	(0 34)
LRC	-0 03				
	(0 06)				
LIIL	0 04 *	-0 21 ***			
	(0 02)	(0 02)			
LRIH		0 17	-0 01		
		(0 14)	(0 16)		
LITL			-0 02	0 04	
			(0 11)	(0 07)	
LRD				1 73	1 61
				(0 10)	(1 77)
LIFL					0 13
					(0 19)
LTCC	0 17 *				
	(0 09)				
LTCIL	-0 21 ***	0 05*			
	(0 05)	(0 07)			
LTCIH		0 01	0 19**		
		(0 06)	(0 08)		
LTCTL			0 05	0 56 ***	
			(0 09)	(0 07)	
LTCD				0 21	3 29
				(0 18)	(7 27)
LTCFL					-0 09
					(0 34)
ILHAT	0 46				
	(1 82)				
IHHAT		0 10			
		(0 93)			
TLHAT			-0 01		
			(0 35)		
DHAT				-0 09	
				(0 16)	
FLHAT					1 05
					(3 87)
CHI-SQR	53 13	103 13	22 52	100 31	11 75

Asymptotic standard errors are reported in parentheses
***, ** & * represent significance at 1, 5 and 10 percent levels, respectively